

REMARKS

Claim 27-57 are currently pending in the application. Claims 27-34, 37-39, 50, and 55-57 have been amended. Claims 1-26 were previously canceled. Applicant respectfully requests reconsideration of the pending claims in view of the following remarks.

Claim Objections

The Examiner objected to Claims 28-33, 37-39, and 55-57 for various informalities. The claims have been amended to address these informalities.

With respect to Claim 30, the Examiner indicated that "Claim 30 is objected to because it is unclear how 'modifying the treatment plan and the dose distribution' is different from 'adjusting how the dose is received by the patient' as claimed in claim 27." The language "adjusting how the dose is received by the patient" could be accomplished by modifying the treatment plan and the dose distribution, but there are also other ways in which to adjust how the dose is received by the patient. Claim 30 just specifies one way of adjusting how the dose is received by the patient. Accordingly, Claim 30 has not been specifically amended to address the Examiner's objection as noted above.

Claim Rejections – 35 U.S.C. § 103

The Examiner rejected Claims 27-57 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,117,829 ("Miller") in view of U.S. Patent Application Publication No. 2002/0080915 ("Frohlich").

Miller does not disclose the subject matter of amended independent Claim 27. More specifically, Miller does not disclose a method for achieving a desired dose distribution comprising at least the following elements:

- (a) obtaining at least one three-dimensional image from the patient in substantially a treatment position, the three-dimensional image being used for volumetric dose calculations;
- (b) comparing the at least one treatment planning image and the at least one three-dimensional image; and
- (c) adjusting how the dose is received by the patient based on the comparison.

Rather, Miller discloses an alignment system for aligning a specified tissue volume of a patient with a charged-particle beam of a radiation therapy system. The patient is immobilized in a form-fitted pod, and reference radiographs and CT scan data are acquired. The patient is then allowed to return home. The CT scan data is analyzed and used to prepare a treatment plan for the patient. Once the treatment plan is finalized, the patient returns to the treatment

location and repositioned within the pod. After the patient is positioned in the beam delivery system, an X-ray image is acquired that produces another radiograph, which is compared to the previously acquired radiographs (prior to treatment) to verify that the correct entry angle for the beam and correct patient position have been achieved.

The radiograph image acquired by the x-ray source while the patient is positioned in the beam delivery system are only two-dimensional; not three-dimensional as specified in the claim. In addition, it is known in the art that two-dimensional x-ray images do not include the information necessary for a volumetric dosimetric calculation. Therefore, the radiograph acquired while the patient is positioned in the beam delivery system is not suitable for dose calculation.

Frohlich does not cure the deficiencies of Miller. Frohlich does not disclose a method for achieving a desired dose distribution comprising at least the following elements:

- (a) obtaining at least one three-dimensional image from the patient in substantially a treatment position, the three-dimensional image being used for volumetric dose calculations;
- (b) comparing the at least one treatment planning image and the at least one three-dimensional image; and
- (c) adjusting how the dose is received by the patient based on the comparison.

Rather, Frohlich discloses a method of inverse planning for radiation therapy treatment including calculating a dose distribution for multiple treatment solutions and displaying the results for at least two of the treatment solutions for comparison by a treatment planner. The displaying of the two treatment solutions allows the treatment planner to select a desired one of the treatment solutions.

Frohlich focuses on the treatment planning portion of the process and does not disclose subject matter related to obtaining an image of a patient after the treatment planning process is completed and just prior to treatment delivery. Frohlich does not disclose "obtaining at least one three-dimensional image from the patient in substantially a treatment position, the three-dimensional image being used for volumetric dose calculations," "comparing the at least one treatment planning image and the at least one three-dimensional image," and "adjusting how the dose is received by the patient based on the comparison."

For at least these reasons, Miller and Frohlich do not disclose the subject matter of Claim 27. Accordingly, independent Claim 27 is allowable. Claims 28-43 depend from Claim 27 and are allowable for at least the reasons Claim 27 is allowable. Claims 28-43 may include additional patentable features not discussed herein.

Miller does not disclose the subject matter of independent Claim 44. More specifically, Miller does not disclose a method of delivering radiation therapy comprising at least the following elements:

- (a) generating a plurality of radiation treatment plans for the patient based on the first image;
- (b) acquiring a second image of the region of interest while the patient is in substantially a treatment position, the second image being three-dimensional; and
- (c) selecting one of the radiation treatment plans based on a position of the region of interest in the second image and dosimetric information in the second image.

As noted above, the radiograph image acquired by the x-ray source in Miller while the patient is positioned in the beam delivery system are only two-dimensional; not three-dimensional as specified in the claim. In addition, it is known in the art that two-dimensional x-ray images do not include the information necessary for a volumetric dosimetric calculation. Therefore, the radiograph acquired while the patient is positioned in the beam delivery system is not suitable for dose calculation.

Frohlich does not cure the deficiencies of Miller. Frohlich does not disclose a method of delivering radiation therapy comprising at least the following elements:

- (b) acquiring a second image of the region of interest while the patient is in substantially a treatment position, the second image being three-dimensional; and
- (c) selecting one of the radiation treatment plans based on a position of the region of interest in the second image and dosimetric information in the second image.

As noted above, Frohlich focuses on the treatment planning portion of the process and does not disclose subject matter related to obtaining an image of a patient after the treatment planning process is completed and just prior to treatment delivery. Frohlich does not disclose "acquiring a second image of the region of interest while the patient is in substantially a treatment position, the second image being three-dimensional" and "selecting one of the radiation treatment plans based on a position of the region of interest in the second image and dosimetric information in the second image."

For at least these reasons, Miller and Frohlich do not disclose the subject matter of Claim 44. Accordingly, independent Claim 44 is allowable. Claims 45-49 depend from Claim 44 and are allowable for at least the reasons Claim 44 is allowable. Claims 45-49 may include additional patentable features not discussed herein.

Miller does not disclose the subject matter of amended independent Claim 50. More specifically, Miller does not disclose a method of delivering radiation therapy comprising at least the following elements:

- (a) acquiring a second image of the patient substantially in a treatment position, the second image being three-dimensional and suitable for three-dimensional contouring;
- (b) identifying a patient position with respect to a radiation delivery device based on dosimetric information and the contour.

The radiograph image acquired by the x-ray source while the patient is positioned in the beam delivery system is only two-dimensional; not three-dimensional as specified in the claim. In addition, a two-dimensional x-ray image is not suitable for three-dimensional contouring.

Frohlich does not cure the deficiencies of Miller. Frohlich does not disclose a method of delivering radiation therapy comprising at least the following elements:

- (a) acquiring a second image of the patient substantially in a treatment position, the second image being three-dimensional and suitable for three-dimensional contouring, and
- (b) identifying a patient position with respect to a radiation delivery device based on dosimetric information and the contour.

As noted above, Frohlich focuses on the treatment planning portion of the process and does not disclose subject matter related to obtaining an image of a patient after the treatment planning process is completed and just prior to treatment delivery. Frohlich does not disclose "acquiring a second image of the patient substantially in a treatment position, the second image being three-dimensional and suitable for three-dimensional contouring" and "identifying a patient position with respect to a radiation delivery device based on dosimetric information and the contour."

For at least these reasons, Miller and Frohlich do not disclose the subject matter of Claim 50. Accordingly, independent Claim 50 is allowable. Claims 51-54 depend from Claim 50 and are allowable for at least the reasons Claim 50 is allowable. Claims 51-54 may include additional patentable features not discussed herein.

CONCLUSION

In view of the foregoing, entry of this Amendment and allowance of the pending claims are respectfully requested. The undersigned is available for telephone consultation during normal business hours.

Respectfully submitted,

/julie a. haut/

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